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'Forever Chemicals' Linked to Increased Mortality From Heart Disease, Kidney and Testicular Cancer

A new study by Italian researchers is the first to formally demonstrate the link between PFAS exposure and cardiovascular mortality in the world's largest exposed population.

By John-Michael Dumais

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Exposure to PFAS, or "forever chemicals," is associated with an increased risk of mortality from cardiovascular disease, kidney cancer and testicular cancer, according to a new Italian study.

The longitudinal study, published April 16 in Environmental Health, is the first to formally demonstrate the link between perfluoroalkyl and polyfluoroalkyl substances exposure and cardiovascular mortality in the world's largest exposed population, according to the authors.

The findings add to the growing body of evidence on the health risks associated with PFAS, a group of synthetic chemicals used in a wide range of consumer products and industrial applications.

Meanwhile, the U.S. Environmental Protection Agency (EPA) last week announced it finalized a rule designating PFOA and PFOS as hazardous substances under the Superfund law. And on April 10, the agency announced the first enforceable legal limits for PFAS in drinking water.

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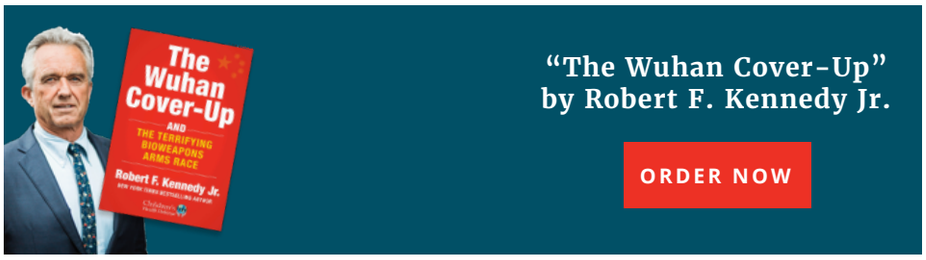
The U.S. Food and Drug Administration (FDA) last week published an update on testing results for PFAS in food, indicating potential danger with the chemicals accumulating in fish. Additionally, it disclosed a revised testing method that can identify nearly twice as many PFAS chemicals in food.

The study and announcements come amid recent news exposing the presence of PFAS in Band-Aids, plastic food containers, firefighter gear and artificial turf, raising concerns about the ubiquity of these substances and their effect on human health.



'Great and tragic natural experiment' of PFAS contamination

The Italian study, led by researchers from the University of Padua, focused on an area in the Veneto region of northern Italy with a total population of about 150,000.

The area has been affected by PFAS water contamination since the 1980s, primarily due to emissions from a manufacturing plant that produced PFAS-containing products.

The area qualified as "the world's largest episode of PFAS water contamination reported so far," according to the study's authors.

The researchers analyzed mortality data of nearly 60,000 people from 1980 to 2018, comparing the exposed population to a reference group from the same region.

They found that during the 34 years following the onset of PFAS contamination in 1985, the exposed population experienced 3,890 more deaths than expected based on the mortality rates of the reference group.

"In other words, every three days there were 12 deaths vs. 11 expected," the authors said.

The excess deaths were largely attributed to cardiovascular disease, with the exposed population showing a significantly higher risk of dying from heart diseases, especially ischemic heart disease, characterized by the buildup of coronary plaque known as atherosclerosis that blocks arteries over time.

The study also found increased mortality from kidney and testicular cancers, consistent with previous research suggesting a link between PFAS exposure and these malignancies.

In the most affected area studied (Red area A), the odds of mortality from kidney cancer were 73% higher from 2015 to 2018.

Between 1985 and 1999, the researchers found an overall 40% increase in the odds of mortality from testicular cancer and a 156% increase for the most affected area.

However, no additional risk was noted after 1999, which the authors attributed to improvements in the treatment of the disease.

The strength of the Italian study lies in its unique design, which leverages the "great and tragic natural experiment" of the PFAS contamination in the Veneto region.

By comparing the exposed population to a reference group from the same area,

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the researchers were able to control for potential confounding factors and establish a clearer link between PFAS exposure and health outcomes.

However, the researchers acknowledged some limitations, such as the reliance on aggregate data at the municipality level and the inability to adjust for individual-level factors like smoking or diet.

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Study authors call for immediate ban on PFAS production

The researchers suggested PFAS exposure may lead to an increased risk of cardiovascular disease through two main pathways: the development of atherosclerosis and the occurrence of post-traumatic stress disorder (PTSD).

"PFOA [perfluorooctanoic acid, a widely studied PFAS chemical] increases the serum levels of total cholesterol and low-density cholesterol," the authors explained, citing previous studies.

Elevated cholesterol levels are well-established risk factors for atherosclerosis, a condition characterized by the buildup of plaque in the arteries, which can lead to heart attacks and strokes.

PFAS serum levels in children, adolescents and young adults in the region were also associated with several markers of cardiovascular disease, including blood pressure, triglyceride levels, total cholesterol and low-density cholesterol.

The authors also noted the possible role of diabetes in cardiovascular disease among PFAS-exposed individuals, finding an excess risk after 2010. They suggested future research on this topic.

"Associations of serum PFAS concentrations with multiple glycemic indicators of type 2 diabetes like glucose and insulin have often been reported, but epidemiological studies have yielded more conflicting results," they stated.

The researchers proposed that the psychological impact of living in a PFAS-contaminated area may contribute to the development of PTSD which may in turn be associated with an increased risk of cardiovascular disease.

"Exposure to an environmental contamination resulting from industrial processes or accidents is psychologically stressful for the affected communities," they wrote.

The allostatic overload occurs when "stress causes physiological changes and imbalances in stress mediators such as glucocorticoids from the adrenal glands, excitatory amino acids and cytokines," the researchers said.

One local study cited in the paper noted high levels of parental anxiety regarding the health and quality of life of their children due to PFAS exposure.

Chronic stress can also increase the risk for hypertension and ischemic heart disease, the researchers pointed out, while stress itself, from any source, "interacts with exposure to pollutants and amplifies their effects by compromising, for example, the immune system."

PFAS chemicals also have been linked to alterations in lipid metabolism during pregnancy and endocrine disruption, which can contribute to the development of chronic diseases.

The findings on kidney and testicular cancer are consistent with previous research, the authors noted, including a recent reevaluation by the International Agency for Research on Cancer (IARC), which classified PFOA as "carcinogenic to humans" and PFOS (perfluorooctanesulfonic acid, another common PFAS chemical) as "possibly carcinogenic to humans."

A recent "RFK Jr Podcast" discussing firefighters' PFAS exposure from turnout gear and fire-suppression foam also highlighted the high rates of prostate and testicular cancer in men and reproductive disorders in women.

"Our findings add some evidence to the existing literature," the study authors wrote while acknowledging the evidence for testicular cancer was limited by the reliance on mortality data, as advances in treatment have improved survival rates.

The researchers called for an immediate ban on PFAS production and the implementation of additional remediation activities in contaminated areas, given their findings and the recent IARC revision.

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New EPA rule makes polluters pay for cleanup

The EPA last week finalized a rule designating two widely used PFAS chemicals, PFOA and PFOS, as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as the Superfund law.

The action, which drew attention to the growing concern over the health effects of "forever chemicals," empowers the EPA to compel polluters to pay for or conduct investigations and cleanup of PFAS contamination.

The rule requires that entities immediately report releases of PFOA and PFOS that meet or exceed the reportable quantity of one pound within 24 hours to the National Response Center and to state, tribal and local emergency responders.

EPA Administrator Michael S. Regan called the new PFAS strategic roadmap "a whole-of-agency approach to protecting public health and addressing the harm to communities overburdened by PFAS pollution."

Regan said the Superfund authority "will allow EPA to address more contaminated sites, take earlier action, and expedite cleanups, all while ensuring polluters pay for the costs to clean up pollution threatening the health of communities."

The EPA's action is based on scientific evidence demonstrating that exposure to PFOA and PFOS is linked to adverse health effects, including various cancers, cardiovascular and immune system damage, decreased fertility in women and adverse neurodevelopmental effects in children.

The EPA's announcement highlighted $9 billion in funding to address PFAS and other emerging contaminants in drinking water, and an additional $12 billion supporting general drinking water investments, including PFAS treatment.

Environmental and public health advocates praised the EPA's action. "It's long past time for the polluters who poisoned all of us to be held responsible," said Ken Cook, president and co-founder of Environmental Working Group.

"This decision is particularly welcomed by communities residing near these bases and Superfund sites, who have long been frustrated by the EPA's perceived inaction in compelling polluters to address their pollution," wrote environmental scientist Mindi Messmer on her Substack.

Messmer was referring to the PFAS contamination at the former Pease Air Force Base in Portsmouth, New Hampshire, which has adulterated the coastal shellfish population and the Coakley Landfill Superfund Site, which has polluted drinking water wells in several New Hampshire towns.

FDA update of PFAS testing of food samples

The FDA in an April 18 PFAS update reported on its recent testing of nearly 1,300 food samples — including "bread and grains; fruits and vegetables; and, meat, eggs, and dairy products, including milk" — as part of its Total Diet Study or from what it collected as part of targeted assignments.

The agency has been testing for 16 different types of PFAS. The results so far reveal that the majority of the tested foods do not contain detectable levels of these substances.

Reporting on one dataset of 95 samples, the FDA detected PFAS in eight samples — "two beef and two cod samples, and one sample each of shrimp, salmon, catfish, and tilapia" — but stated that the levels measured were "not likely to be a health concern for young children or the general population."

The FDA noted the higher levels of PFAS found in fish and seafood may be due to the potential of "filter feeders, such as clams, but also other bivalve mollusks, including oysters, mussels, and scallops" to bioaccumulate more environmental contaminants than other types of sea animals.

To address the growing concerns, the FDA developed new analytical methods to detect and quantify PFAS in food samples, including an updated method that can measure 30 different PFAS types in various "food matrices."

The agency is also working with state and local authorities to identify and investigate areas with known PFAS contamination and to assess the safety of locally grown and produced foods.

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John-Michael Dumais

John-Michael Dumais is a news editor for The Defender. He has been a writer and community organizer on a variety of issues, including the death penalty, war, health freedom and all things related to the COVID-19 pandemic.

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